A MULTIDISCIPLINARY TEAM APPROACH AT HIGH-ACCIDENT LOCATIONS

James R. Ogren EIT
Jack Leisch and Associates
Robert D. Miles, P.E.
School of Civil Engineering
Purdue University

INTRODUCTION

Every transportation engineer is concerned about accidents on the highway system. Accidents are chance events but certain locations on the transportation system have an abnormally high frequency of accidents. High-accident locations usually have some factors incorporated in them that contribute to accidents. These factors need to be discovered, evaluated and resolved particularly if a design defect or traffic operation defect exists. Roadway intersections are sites of high-accident rates particularly where one of the highways is a four-lane divided highway.

It is considered in the domain of the traffic engineer to locate high-accident locations and attempt to correct them. Determining the causes of accidents is very complex because accidents themselves are very complex. An accident has several possible causal factors including the roadway, the driver, the auto or any combination. Of these factors, the most easily controlled is the roadway environment because it can be changed by redesign. The driver and the auto, except by licensing and vehicle inspection, are not easily controlled. A more complete review of high-accident sites needs to be undertaken in these defects in the system are to be alleviated. This research was undertaken to attempt to formulate a procedure to review high-accident locations and their inherent complexities and hopefully reduce their accident numbers.

MULTIDISCIPLINARY TEAM—DEFINITION

This research applied the concept of a multidisciplinary team to identify the predominant accident types, probable causal factors and to suggest countermeasures for high-accident locations. A working definition of a multidisciplinary team was a group of people from various

disciplines using their various degrees of experience and knowledge to form a consensus on the causal factors and methods of correction in the analysis of high-accident locations.

It was decided after reviewing the literature to form a five-person team consisting of an ISHC central office traffic engineer, an ISHC district office traffic engineer, a local traffic engineer, a local law enforcement officer, and a human factors expert. It was felt that this five-member team was manageable and encompassed experts in both the roadway and driver elements of high-accident locations.

HIGH-ACCIDENT SITES

Sixteen sites involving 18 intersections were studied. Two of the sites were interchanges, each counting as two intersections where the off ramps meet the cross streets. All the sites were identified by the Indiana State Highway Commission as high-accident locations.

After reviewing the statewide distribution of the 18 intersections to be studied, four multidisciplinary teams were formed. Three of the teams centered around cities within the vicinity of the high-accident locations. These were Kokomo, Indianapolis and Bloomington. The fourth team was an independent team that studied outlying locations that were not conveniently studied by one of the other three teams. The independent team was formed with Purdue University and ISHC personnel. The human factors expert was considered an important part of each team to provide a new perspective of high-accident locations.

FIELD PRQCEDURAL MANUAL

A field procedural manual was developed to guide the multidisciplinary team in their independent investigations. The following criteria were considered important to make the study effective. The first criterion was that the manual should be complete, simple, and clear in its reference to the goals and objectives of the team. Secondly, the manual outlined the function of the team, what data needs were to be provided and what was required of team members. Thirdly, the manual outlined concisely the field procedure that was to be followed by the team members as well as the team leader. Lastly, and most importantly, the manual and the prescribed procedure were to be flexible so as to be applicable for any high-accident location to be selected for study by a multidisciplinary team. The organization of the team was discussed in the manual with reference to the individual member's job description. The field equipment, as a minimum, requires an automobile for each team member to drive each leg of the site and a notebook. A tape re-

corder would be helpful in the field investigation. The field data requirements for each high-accident site consisted of a condition diagram, three-year collision diagrams, three-year accident summary tables and traffic volumes for the maneuvers at the site over the three-year period.

The manual prescribes the field investigation procedure of the high-accident locations. The procedure was outlined in 26 steps with the first 18 required of the individual team members in their investigation and the rest for the team leader to follow in the evaluation of the reports submitted by the individua lteam members.

BRIEFING OF TEAM MEMBERS

A briefing session of the members was conducted. A data package for the high-accident site was given to each team member which contained the procedural manual, a condition diagram, a volume diagram for three years, accident summary tables for three years, collision diagrams for the same three years, and the necessary evaluation forms. At this briefing meeting a date for the return of the materials was determined. The members then were required to visit the site individually and not discuss the site with other members of the team.

FIELD INVESTIGATIONS, REPORTS, AND RECOMMENDATIONS

The members were required to personally drive all the approaches to the site recording manually and/or on a tape recorder any comments or observations. A field review of the condition diagram, collision diagrams, accident summary tables and volume diagrams and general observation of the site was required. The members were required to submit a report of their findings and to determine predominant accident types, the causal factors and the possible countermeasures. The team leader must interpret the several members' evaluation forms and summarize the results and determine if a consensus was formed as to the accident type, possible causes and countermeasures. After the teams concluded their field investigations of the high-accident locations, their evaluations were evaluated by the team leader on two different forms. The first form tabulated the results by accident type, casual factors, and countermeasures whereas the second form tabulated the results by accident type and countermeasures only. In the first analysis of the 18 high-accident sites, neither tabulation gave very strong concurrence among the team members of causal factors and countermeasures, although comprehensive listings were developed. It was then decided to have two of the teams meet as a team to attempt to develop a consensus. The two teams that met were the Indianapolis team and the

independent team. The two teams discussed five specific high accident locations. Through the free flow of ideas at the meetings a consensus as to the major accident type and countermeasures was reached. Good results were obtained at these five locations. A report on each high accident location was prepared and submitted to the Chief, Division of Traffic, ISHC.

CONCLUSION

Through this research effort it was concluded that the multidisciplinary team concept as outlined herein was applicable to the investigation of high-accident locations by identifying the major accident types, suggesting causal factors and recommending possible countermeasures. A manual was developed that directs team members through the procedure of a comprehensive field investigation of high-accident sites. It was recommended that the procedures become a permanent part of the accident analysis process of the ISHC. The use of the multidisciplinary team to evaluate high-accident locations is, of course, applicable to other transportation jurisdictions such as cities and counties.